

Charles M. Russell NWR Fence Mapping & Inventory FY-2014

FINAL REPORT

PROJECT DESCRIPTION

GIS mapping refuge pasture boundaries and documenting historic domestic livestock use to accurately assess the overall grazing/browsing use of Refuge habitats.

Fence mapping and livestock pasture boundaries had been completed in GIS for roughly 2/3 of the refuge. This project was needed to complete accurate mapping of the remainder of the refuge, all of which was in Garfield County.

OBJECTIVES AND ALTERNATIVES

1. Complete mapping (GIS) of all existing fences to delineate pasture boundaries on the refuge.
2. Complete historic livestock grazing records/occurrence in an electronic database/GIS and link to each grazing unit over time for the entire refuge.
3. Using the updated map layers and complete livestock grazing history, coupled with native ungulate population monitoring, we will spatially depict historic and current herbivory intensity and develop a predictive model of expected habitat quality.
4. Synthesize existing legacy data (i.e. grouse surveys, mule deer and elk surveys, HDP, fire) in electronic formats with finalized habitat unit and grazing history layers. The refuge has 20 years of grouse monitoring data and more than 10 years of native ungulate population monitoring along with a fire history database/GIS that dates back to 1980. We envision this objective as a second phase of this project that cannot be fully started until objectives 1, 2 and 3 are completed.

METHODS AND PROTOCOLS

Collection of the fence & fence structure data was completed by biological technicians hired for this project by hiking alongside each fence and using ArcPad software on Trimble GPS units to map and record features such as fence type and construction, post type, number/type of wires, condition, etc. Natural barriers to livestock

movement created by lakeshore and topography was used to complete grazed polygon boundaries. Detailed grazing data (e.g. start/end dates, number/type of livestock, etc.) dating back to 1987 was compiled in electronic spreadsheet formats through 2008. Once the pasture GIS layers have been completed, and protocols established for handling fence boundary changes over the years, we will “join” that detailed grazing data to each grazing unit polygon in GIS. The perimeter boundaries totaled 1,165 miles around the 60 grazing polygons totaling about 250,000 acres in Garfield County, the focus for this project.

DATA ANALYSIS / MODELS

All fence/pasture boundary data for the entire refuge (3,365 miles of perimeter boundary around 185 polygons totaling 815,000 acres) was compiled into ArcGIS geodatabases. Grazing data from 1987 through 2008 for each habitat unit was entered electronically and totaled 2,788 records. This stage of the effort achieved objectives 1 and 2.

Work to achieve objective 3 has been, and remains, an ongoing effort that is now about 80% complete for the entire refuge through the 2014 grazing season.

DATA MANAGEMENT

During field work, data was checked into an ArcGIS database daily on a designated laptop computer. Data was also backed up locally daily and off-site biweekly. Each day the mapping occurred, the fence database would be “checked out” to the field GPS units to be modified with new fence data. At the end of the day the mapped fences were “checked in” the database. A paper data sheet was completed daily with other information to track the project’s progress. All grazing-related data is housed on staff computers around the refuge and the CMR server in Lewistown. At present, only staff members actively working on refinements, editing and

corrections to the data have access and they employ rigorous and routine data backup safeguards.

PARTNERS

Numerous CMR staff have, and continue to, contribute to this overall project. Notably, Neil Kadrmaz, Mary Jo Hill and Shane Weigand completed the lion's share of the field mapping in Garfield County with assistance from the entire Jordan Field station staff over several years.

SOURCES OF SUPPORT

Technical support was provided by both CMR and Regional GIS staff for assistance with hardware/software issues and lending of equipment. CMR-Jordan staff was able to provide assistance in locating and accessing fences. Jordan management and fire staff assisted throughout the field seasons with mapping and logistical needs.

CURRENT STATUS

Much of the field work was completed in 2012, yet more than 150 miles of fence remained to be mapped in FY-2013. The following is from the FY-2012 progress report:

2012 Highlights

- 171 miles of fence and 6,619 fence structures were mapped & inventoried.
- 37 days (8-12hrs/day) spent in the field mapping with 1-2 personnel a day, but sometimes required additional staff for logistical/transport needs.

The FY-2012 Progress report can be referenced for a status map of progress then.

Funding provided in this Inventory and Monitoring award (\$56,000) was used to achieve Objectives 1 and 2, supporting primarily field technician salaries and benefits, field transportation and minor amounts for travel and equipment. The project is complete and finalized

for the portion funded by this award, however work continues on the bigger, overall project. Annual updates will be required as both livestock and native ungulate herbivory vary in both time and space.

CHALLENGES

The logistical challenges of this project were numerous as the scope of project was large and required the bulk of several field seasons for the station's biological technicians (1 Term & 1 STEP Seasonal). Fences are located in areas with limited or no vehicle access with difficult or steep terrain. Some fences required boat access. Permission was also needed from private landowners to access portions of the refuge that are inaccessible to the general public or special use by refuge employees.

MORE INFORMATION

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